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Wildlife Notes — 175-28

WHITE-TAILED DEER

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The white-tailed deer, *Odocoileus virginianus,* derives its common name from the fact that the underside of its tail is covered with white hair, and when it runs it often holds its tail erect so that the white undersurface is visible. Whitetails belong to the Cervidae family which in North America includes the elk, moose, caribou, and mule deer. Cervids are split-hoofed mammals with no incisor teeth in the front of the upper jaw. They are classed as ruminant animals, meaning they have a four-chambered stomach and frequently chew a "cud." Adult male cervids grow and shed a set of antlers each year. Most female caribou also grow antlers, and an occasional antlered doe occurs in whitetails.

Scientists have identified thirty subspecies of whitetails in Central and North America. Whitetails occur from southern Canada south through the United States and Mexico to Panama, but they are absent from most of Canada, Nevada, and Utah. They occur commonly throughout Pennsylvania.

The largest of the subspecies is the northern woodland whitetail, and the smallest is the endangered Florida Key deer. The subspecies occurring throughout most of Pennsylvania is the Virginia whitetail, which is slightly smaller than the northern woodland whitetail.

In Pennsylvania the average adult male buck weighs about 140 pounds live weight and stands 32 to 34 inches at the shoulder. He is about 70 inches long from the tip of his nose to the base of his tail. His tail vertebrae add only about 11 inches, but the long hair makes it far more conspicuous. Does tend to average less in weight and body length than males of the same age from the same area.

Deer weights vary considerably, depending upon age, sex, diet, and the time of year the weight is checked. For example, breeding-age bucks may weigh 25 to 30 percent more at the onset of the breeding season than they do at its conclusion. Hence, a 140-pound buck in December might have weighed approximately 180 pounds in September.

Hair color is alike in both sexes. In adults the belly, throat, areas around the eyes, insides of the ears, and the underside of the tail are white all year long. In summer the upper parts of the body are reddish brown, and in winter they are grayish brown. Summer hairs are short, thin, straight, and wiry. Winter hairs are long, thick, hollow, and slightly crinkled. Winter hairs afford the deer excellent protection against the cold. Summer coats are shed in August and September, winter coats in May and June.

Melanistic and albino deer occur but they are rare. Partial albinos, sometimes called "piebalds" or "calico" deer, occur more frequently.

Fawns are born with white spots in the upper coat. When a fawn is lying on the ground or in dry leaves, this coat looks like the sun hitting the ground after it passes through the treetops. This provides excellent camouflage for the fawns. Their summer coats are molted about the same time as the fall molt in adults, and fawns take on the same coat colors as adults in the fall.

Whitetails have scent-producing glands: two tarsals, one

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inside each hind leg at the hock joint; two metatarsals, one on the outside of each hind leg between the hock and the foot; and four interdigitals, one between the toes of each foot. The tarsals and metatarsals release scents conveying excitement or fear, while the interdigitals produce odors which let deer trail each other by smell.

Deer can run at 40 miles per hour for short bursts and maintain speeds of 25 miles per hour for longer periods. They are also good jumpers capable of clearing obstacles up to 9 feet high or 25 feet wide. The air-filled hairs of their coats enable them to swim easily.

Although whitetails are color-blind and have a hard time identifying stationary objects, they are easily alerted by movement. Nature has compensated for their poor vision with keen senses of smell and hearing which help them detect danger.

Usually deer are silent, but they can bleat, grunt, whine, and when alarmed or suspicious, make loud "whiew" sounds by forcefully blowing air from their nostrils. Does whine to call their fawns and fawns bleat to call their mothers.

Although antler growth is evident on male fawns, it is not prominent and is known as "buttons." A buck's first set of antlers begins to grow when he is about 10 months of age. Each year after he reaches this age, he will grow and shed a new set of antlers. Typical antlers curve upward and outward to point forward, and consist of two main beams with individual tines growing upward from them.

If the yearling buck comes from an area which has poor food conditions, his first set of antlers may be only "spikes" — antlers consisting of single main beams only. Spikes are more common in yearling deer than older ones because antler growth starts at a time when the young buck's body is still growing rapidly. But because antler development is tied in closely with the animal's nutritional status, older bucks might also carry spikes if they come from an area with poor food conditions. More of the nutriments in the young buck's body are going for body growth than in older bucks, hence, less are available for antler development. Fifty percent or more of the yearling bucks from poor deer range in Pennsylvania may produce only spikes, compared to 10 percent or less from good deer range.

Antlers generally begin to grow in March or April. Growing antlers are covered by a skin called "velvet." This velvet is covered with soft hairs and contains blood vessels which supply nutriments to the growing antlers. The solid bone-like substance which makes up the polished antler is secreted by cells on the inside of the velvet. By August or early September antler growth ceases and the velvet is shed or rubbed off by the buck as he rubs saplings, shrubs, or rocks with his antlers. Polished antlers are carried throughout most of the breeding season, which lasts into late February. The antlers are shed at the end of this period, and a new set begins to grow in March or April.

When antlers are growing they are soft and subject to injury. Bent and twisted tines and main beams are a result of injury to the antler while it was growing. Broken antlers occur after the antler has stopped growing and is hard. The small cavities sometimes seen in polished antlers are a result of botfly larvae damage during the growing period.

The antler cycle is influenced by secretions from the pituitary gland. Changes in length of daylight periods and, to a lesser degree, temperature influence the hormone secretions from this gland. The hormone prolactin is believed to be a factor in the initiation of new antler growth. Increases in the amount of the male hormone testosterone in the blood of whitetail bucks in late August and early September cause blood flow to the antlers to stop. The velvet dies and is shed or rubbed off. Throughout the breeding season, testosterone levels continue to increase until they hit a peak in November. This peak coincides with the peak breeding dates. Testosterone levels begin to fall after this, and when they reach a low enough level the antlers are shed.

In general, shedding of antlers occurs earlier in northern states than in southern ones. Spike bucks tend to retain their velvet longer and shed their antlers sooner than bucks with branched antlers. The roles of age and nutrition in the length of antler retention are not fully understood at present.

SOCIAL ORGANIZATION

The social organization of the whitetail deer is largely matriarchal. Although large numbers of deer are sometimes seen together in feeding areas or wintering areas, these associations are usually temporary and do not reflect the same strong ties as family associations between related does. The most common social group is an adult doe, her fawns, and her yearling female offspring. Sometimes three or four generations of related does are present in a single family group. When fawning season rolls around in late May, adult does leave the family group and remain alone to bear and rear their fawns. Once a pregnant doe leaves the family circle to bear her fawns, her yearling offspring are left on their own for the summer.

Siblings tend to remain together throughout most of the summer. Sibling groups which include yearling bucks separate in September as the rut approaches. Yearling bucks tend to disperse from the mother's home range at this time. Yearling does remain in the mother's home range and generally rejoin their mother and her new fawns between September and October.

During the breeding season adult and yearling bucks tend to stay alone except when in pursuit of a female who is approaching estrus. After the breeding season in late January, yearling and adult bucks form loose associations of small groups, usually 2 to 4 animals, which remain together throughout most of the winter and summer months. These groups break up around September when the rut starts.

REPRODUCTION

The mating season of white-tailed deer begins in September and lasts into late January. Breeding activity reaches its peak in mid-November, and most adult females have been bred by the end of December.

Some female fawns achieve their first estrus at 7 or 8 months of age and produce their first fawns at 14 or 15 months of age.

Age Class	% of ♀ Breeding	FETUSES				
		Average No. Per ♀	Sex Ratio ♂:♀	% of Total ♀ Bred by No. Fetuses Carried		
				1	2	3
Fawn (6 mos.)	45	1.36	130:100	67	31	2
Yearling (18 mos.)	90	1.66	124:100	40	56	4
Adult (30+ mos.)	95	1.84	124:100	21	73	6

Most of these animals breed a month or two later than older does.

The age and nutritional level of the doe influence her reproductive capacity. Females from the best range produce more fawns than those from poor range. The number of fawns annually produced by females increases as their ages increase. There is also a pronounced tendency for young females to produce a larger percentage of male offspring than older does. The nearby table summarizes the average data for deer productivity in Pennsylvania.

FOOD HABITS

Whitetails eat a wide variety of herbaceous and woody plants. In a recent study in Pennsylvania which involved the examination and measuring of the food contained in the rumens of vehicle-killed deer, 98 different plant species were identified. Fifty-seven were tree, shrub or vine species, and 41 were herbaceous plants. There were also a lot of unidentifiable plant materials, mostly herbaceous, which could easily extend the list beyond the 98 identified species.

Food preferences of whitetails depend on the plant species occurring in an area and on the time of year. Green leaves, herbaceous plants, and new growth on woody plants are eaten in the spring and summer. In late summer, fall, and early winter, both hard and soft fruits such as apples, pears, and acorns are a major component of the deer's diet. In winter, evergreen leaves, hard browse, and dry leaves are eaten. Good supplies of a variety of natural foods at all times of the year are essential to the survival and maintenance of a healthy deer population.

HABITAT

A brush-stage forest satisfies two needs for deer: (1) concealment, and (2) food in the form of buds, stems and leaves of shrubs and young trees. Brush is most efficiently created by forest clearcutting. Clearcutting means cutting all trees larger than saplings, leaving an area of land looking "clear." Usually the most use of a clearcut area by deer occurs along its edges. Shaping a clearcut to give it the greatest edge effect will increase its value to deer.

Newly cut treetops provide an immediate source of browse in winter months when snow cover makes other sources of food unavailable. Therefore, when possible, the actual cutting operations should be carried out when the trees are dormant. However, the greatest benefit of clearcutting to deer lies in the often abundant herbaceous vegetation, new succulent stump sprouts, root sprouts and seedlings, that flourish in the sunlight following the cutting. Once established, this new thick growth also provides concealment for deer, not only in the early years following the cutting, but for a longer period, after much of the browse has grown out of their reach.

While most deer habitat management should revolve around a forest cutting program, including the establishment of herbaceous openings, a conifer tree planting program to shelter deer in severe winter weather is sometimes necessary where suitable cover of that type is absent. The value of these plantations to deer is low during most of the year but high during winter. As with clearcutting, conifer plantations should be kept small and scattered. Large plantations are unnecessary. Small clumps of only 30 to 60 trees will suffice. Individual trees within the plantation can be spaced as far apart as eight to ten feet. Preferably, these clump plantings should be located in lowlands or on south-facing slopes.

MANAGEMENT
HERD (Population)

Deer are a valuable natural resource which can be maintained indefinitely where suitable habitat exists. If managed wisely, they are a valuable public asset. Economically, they generate significant revenues for many rural communities because they attract hunters and wildlife watchers. Public support of sound management programs is essential to maintaining the deer population as a public asset to be enjoyed by future generations of Pennsylvanians and visitors to Pennsylvania.

Management of the deer herd means controlling the size of the deer population. Population control can be achieved only by harvesting female deer. In Pennsylvania this is accomplished through regulated antlerless deer seasons. Restrictions on the number of deer a hunter may take, the number of persons hunting in a given county, and the length of the season are the methods used to control the antlerless harvest. The number of antlerless deer to be taken in any county is determined from the estimated deer population and the ability of the forest habitat to support that number during the winter.

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WILDLIFE NOTES AVAILABLE

175-1	Squirrels (Gray, red, fox and flying squirrels)
175-2	Ruffed Grouse
175-3	Bobcat
175-4	Cottontail Rabbit
175-5	Red and Gray Foxes
175-6	Woodchuck
175-7	The Varying Hare (Snowshoe Rabbit)
175-8	The Night Hunters: Owls (Barn, great horned, snowy, barred, long-eared, short-eared, screech, and saw-whet owls)
175-9	Raccoon
175-10	Raptors (Goshawks; sharp-shinned, Cooper's, red-tailed, red-shouldered, broad-winged, rough-legged hawks; harrier, peregrine, merlin and kestrel)
175-11	Otter
175-12	Crows & Ravens
175-13	Woodpeckers
175-14	Beaver
175-15	Bobwhite
175-16	Heron Family
175-17	Wild Turkey
175-18	Dove
175-19	Ring-Necked Pheasant
175-20	Canada Goose
175-21	Woodcock
175-22	Minks & Muskrats
175-23	Striped Skunk
175-24	Porcupine
175-25	Opossum
175-26	Weasels
175-27	Chipmunk
175-28	White-tailed Deer